(c) reacting the chains of the resulting preliminary adduct with a monomeric, aliphatic trihydroxy compound (triol), the resulting compound is reacted with a cyclic anhydride of dicarboxylic acid and then the acid group formed is converted wholly or partially into a salt by reaction with a base (col. 2, lines 16-29).

These processes, i.e. (a) --> (b) and (a) --> (c), obviously make use of two different alcohols, and corresponds to steps (i) and (iii) according to the claims of the present application.

The '127 patent does not teach using an alcohol selected from alkylene diols having not more than 8 carbon atoms and alkyleneoxy diols having not more than 8 carbon atoms, as defined as the second alcohol in the claims of the present application.

With regard to polyols, it is disclosed in col. 4, lines 3-4 of the '127 patent that the polyisocyanate used in the process can be an addition product of glycerol and toluylene diisocyanate. Accordingly, in case the polyisocyanate used in the process is a triol, isocyanate groups are reacted in sequence with glycerol (polyol) --> (a) --> (b), alternatively glycerol (polyol) --> (a) --> (c). Accordingly, the triol is then first introduced in the process, followed by introducing the alcohol according to (a); i.e., the aliphatic diol having an aliphatic substituent with at least 10 carbon atoms. This sequence teaches away from the claims of the present application.

It should be emphasised that the '127 patent leads away from using triols - "The organic diisocyanates are preferred" (col. 3, line 65); "uncontrollable cross-linking can easily occur in polyisocyanates with 3 or more isocyanate functions in the molecule are used extensively, or in a high proportion" (col. 4, lines 8-11); "preference is given to aromatic diisycyanates" (col. 4, lines 12-13).

Accordingly, the '127 patent essentially teaches the following processes: (a) --> (b) and (a) --> (c) and the use of no polyols; if used, however, they are not preferable, and should be reacted first with the NCO groups.

The present invention makes it possible to use polyols and provides better sizing (when using the obtained anionic polyurethane as a sizing agent in papermaking) compared to the process of the '127 patent, cf. the examples of the present specification where examples 1-8 are in accordance with the present invention and comparative example 9 is in accordance with the teachings of '127 patent.

Claims 1, 2, 5 and 7-18 are rejected under 35 USC 103(a) as being unpatentable over Schurmann (764). This rejection is respectfully traversed.

The Schurmann '764 patent refers to cationic polyurethane and dispersions thereof, the cationic polyurethanes being obtained by
(d) reacting an aliphatic diol having an aliphatic substituent with at least 10 carbon atoms with a polyisocyanate to form a pre-polymer (preliminary adduct) with terminal isocyanate (NCO) groups,
(e) reacting the chains of the resulting preliminary adduct with (A) an aliphatic, monomeric diol containing a tertiary nitrogen atom which is subsequently converted into the corresponding ammonium com-pound, or (B) an aliphatic, monomeric diol containing a nitrogen atom previously converted into the corresponding ammonium compound.

As with the '127 patent, the process of the '764 patent, i.e. (d) --> (e), employs two different alcohols which corresponds to steps (i) and (iii) according to the claims of the present application.

Also in the '764 patent, there is no teaching of using an alcohol selected from alkylene diols having not more than 8 carbon atoms and alkyleneoxy diols having not more than 8 carbon atoms, as defined as the second alcohol in the claims of the present application.

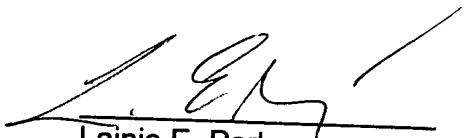
It is disclosed in the '764 patent in col. 3, lines 43-47 that "It is preferred that the polyisocyanate monomer is selected as one which is essentially difunctional, i.e., a diisocyanate, so as to form essentially linear prepolymers and eventually a linear cationic polyurethane".

The polyisocyanate used in the process can be an addition product of glycerol and toluylene diisocyanate. However, it is taught in col. 4, lines 9-14 "[a]gain, it is emphasized that one preferably prepares linear prepolymers and polyurethanes so that the diisocyanates are most valuable for this purpose while other polyisocyanates may then be used only with extreme care".

Accordingly, in case the polyisocyanate used in the process is a triol, isocyanate groups are reacted in sequence with glycerol (polyol) --> (d) --> (e), alternatively glycerol (polyol) --> (d) --> (e). Accordingly, the triol is then first introduced in the process, followed by introducing the alcohol according to (a); i.e., the aliphatic diol having an aliphatic substituent with at least 10 carbon atoms. This sequence teaches away from the claims of the present application. It is however very evident that polyols are not preferably used in the process of the '764 patent.

The present invention makes it possible to use polyols and provides better sizing (when using the obtained cationic polyurethane as a sizing agent in papermaking) compared to the process of the '764 patent, cf. the examples of the present specification where examples 10-11 are in accordance with the present invention and comparative examples 12-13 are in accordance with the teachings of the '127 patent.

Respectfully submitted,



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Encl: Marked Version

MARKED VERSION

IN THE CLAIMS:

Please amend claim 1 as follows:

1. (Amended) A process for the production of charged polyurethanes comprising reacting isocyanate groups of a polyisocyanate with hydroxyl groups of different alcohols comprising

(i) a first alcohol which is one or more diols containing at least 10 carbon atoms;

(ii) a second alcohol selected from the group consisting of alkylene diols having not more than 8 carbon atoms, alkyleneoxy diols having not more than 8 carbon atoms, polyols with at least three hydroxyl groups, and mixtures thereof;

(iii) a third alcohol selected from the group consisting of (a) diols containing a charged group or atom, (b) diols containing an uncharged group or atom capable of charge formation and at least partially converting the uncharged group or atom into a charged group or atom, (c) polyols and further reaction of one or more hydroxyl group derived from the polyol with a compound containing a charged group or atom or a compound containing an uncharged group or atom capable of charge formation and at least partially converting said uncharged group or atom into a charged group or atom, and mixtures thereof;

with the proviso that if said second alcohol is a polyol with at least three hydroxyl groups, then said first alcohol is introduced into the process before or simultaneously with said second alcohol.

worked up claim